IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Ozgur C. Leonard et al.

Application No.: 10/771,698	Confirmation No.: 3805
Filed: February 3, 2004	Art Unit: 2195
For: MULTI-LEVEL RESOURCE LIMITS FOR OPERATING SYSTEM PARTITIONS	Examiner: E. C. Wai

APPELLANTS' BRIEF UNDER 37 CFR §41.37

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Pursuant to 37 CFR § 41.37, please consider the following Appellant's Brief in the referenced application currently before the Board of Patent Appeals and Interferences.

TABLE OF CONTENTS

This brief contains items under the following headings as required by 37 C.F.R.

§ 41.37 and M.P.E.P. § 1205.2:

TABLE OF AUTHORITIES

I.   Real Party of Interest

The real party in interest for the referenced application is Sun Microsystems, Inc. An Assignment transferring all interest in the referenced application from the inventors to Sun Microsystems, Inc. (now doing business doing as Oracle America, Inc.) was filed with the USPTO on February 3, 2004. The Assignment is recorded at Reel 014966, Frame 0363.

II.   Related Appeals and Interferences

To the best of the knowledge of the Appellants and Appellants' legal representative, Application Serial No. 10/768,303 ('303) is a related case to the present application and is also on Appeal to the Board of Patent Appeals and Interferences ("The Board"). The pending Appeal for '303 may have a bearing on, directly affect, or be affected by the decision of The Board in this Appeal.

III.   Status of Claims

U.S. Application Serial No. 10/771,698 ("the '698 Application") was filed on February 3, 2004. As filed, the '698 Application included claims 1-24. Claims 1-24 remain pending in the Application. Claims 1, 9, and 17 are independent. The remaining claims depend, directly or indirectly, from the independent claims.

All the pending claims were rejected in an Office Action dated September 16, 2009 ("Office Action").

Claims 1-24 are on appeal.

IV.   Status of Amendments

All of the amendments have been entered and considered by the Examiner. Appellants did

not file an Amendment after the Final Rejection. The pending claims of record are present in the

Claims Appendix.

V.   Summary of Claimed Subject Matter

The following discussion summarizes the content of the claimed subject matter. The

references to the Specification made below should not be construed as the only location in the

Specification which support or discuss the respective limitation.

Independent claim 1 of the invention discloses a machine-implemented method. The

method includes establishing, within a global operating system environment provided by an

operating system, a non-global partition which serves to isolate processes running within the non-

global partition from at least one other non-global partition within the global operating system

environment. *See, e.g.,* Specification, page 8, lines 10-23; Fig. 1: Step 140. Each of the non-global

partitions share an operating system kernel with the global operating system environment. *See, e.g.,*

Specification, page 10, lines 5-14; Fig. 1: Step 150. Each of the non-global partitions includes a

distinct file system. *See, e.g.,* Specification, page 8, lines 10-23, Fig. 1: Step 180. The method also

includes associating a first resource limit with the non-global partition. *See, e.g.,* Specification,

page 13 lines 23-24 to page 14, lines 1-5, Fig. 2: Step 140. The first resource limit indicates a

maximum amount of a particular resource that may be allocated to the non-global partition. *See,*

e.g., Specification, page 15, lines 8-17; Fig. 4: Step 402. The method also includes associating a

second resource limit with a first group of processes within the non-global partition. *See, e.g.,*

Specification, page 13 lines 23-24 to page 14, lines 1-5; Fig. 2: Step 140. The second resource limit indicates a maximum amount of the particular resource that may be allocated to the first group of processes. *See, e.g.,* Specification, page 15, lines 8-17; Fig. 4: Step 403. The method also includes associating a third resource limit with a second group of processes within the non-global partition. *See, e.g.,* Specification, page 15, lines 8-17; Fig. 4: Step 402. The third resource limit indicates a maximum amount of the particular resource that may be allocated to the second group of processes. *See, e.g.,* Specification, page 15, lines 8-17; Fig. 4: Step 403.

Independent claim 9 of the invention discloses a machine readable storage medium having stored thereon a portion of an operating system. *See, e.g.,* Specification, page 18, lines 5-16; Fig. 8: Step 810. The machine readable medium includes establishing, within a global operating system environment provided by an operating system, a non-global partition which serves to isolate processes running within the non-global partition from at least one other non-global partition within the global operating system environment. *See, e.g.,* Specification, page 8, lines 10-23; Fig. 1: Step 140. Each of the non-global partitions share an operating system kernel with the global operating system environment. *See, e.g.,* Specification, page 10, lines 5-14; Fig. 1: Step 150. Each of the non-global partitions includes a distinct file system. *See, e.g.,* Specification, page 8, lines 10-23, Fig. 1: Step 180. The machine readable medium also includes associating a first resource limit with the non-global partition. *See, e.g.,* Specification, page 13 lines 23-24 to page 14, lines 1-5, Fig. 2: Step 140. The first resource limit indicates a maximum amount of a particular resource that may be allocated to the non-global partition. *See, e.g.,* Specification, page 15, lines 8-17; Fig. 4: Step 402. The machine readable medium also includes associating a second resource limit with a first group of processes within the non-global partition. *See, e.g.,* Specification, page 13 lines 23-24 to page 14,

lines 1-5; Fig. 2: Step 140. The second resource limit indicates a maximum amount of the particular resource that may be allocated to the first group of processes. *See, e.g.,* Specification, page 15, lines 8-17; Fig. 4: Step 403. The machine readable medium also includes associating a third resource limit with a second group of processes within the non-global partition. *See, e.g.,* Specification, page 15, lines 8-17; Fig. 4: Step 402. The third resource limit indicates a maximum amount of the particular resource that may be allocated to the second group of processes. *See, e.g.,* Specification, page 15, lines 8-17; Fig. 4: Step 403.

Independent claim 17 of the invention is directed to an apparatus for implementing at least a portion of an operating system. The apparatus includes a mechanism for establishing, within a global operating system environment provided by an operating system, a non-global partition which serves to isolate processes running within the non-global partition from at least one other non-global partition within the global operating system environment. *See, e.g.,* Specification, page 8, lines 10-23; Fig. 1: Step 140. Each of the non-global partitions share an operating system kernel with the global operating system environment. *See, e.g.,* Specification, page 10, lines 5-14; Fig. 1, 150. Each of the non-global partitions includes a distinct file system. *See, e.g.,* Specification, page 8, lines 10-23, Fig. 1: Step 180. The apparatus also includes a mechanism for associating a first resource limit with the non-global partition. *See, e.g.,* Specification, page 13 lines 23-24 to page 14, lines 1-5, Fig. 2: Step 140. The first resource limit indicates a maximum amount of a particular resource that may be allocated to the non-global partition. *See, e.g.,* Specification, page 15, lines 8-17; Fig. 4: Step 402. The apparatus also includes a mechanism for associating a second resource limit with a first group of processes within the non-global partition. *See, e.g.,* Specification, page 13 lines 23-24 to page 14, lines 1-5; Fig. 2: Step 140. The second resource limit indicates a maximum

amount of the particular resource that may be allocated to the first group of processes. *See, e.g.,* Specification, page 15, lines 8-17; Fig. 4: Step 403. The apparatus also includes a mechanism for associating a third resource limit with a second group of processes within the non-global partition. *See, e.g.,* Specification, page 15, lines 8-17; Fig. 4: Step 402. The third resource limit indicates a maximum amount of the particular resource that may be allocated to the second group of processes. *See, e.g.,* Specification, page 15, lines 8-17; Fig. 4: Step 403.

VI.   GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The rejection to be reviewed on this appeal is the rejection of claims 1-24 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Publication No. 2003/0014466 ("Berger") in view of U.S. Patent Publication No. 2005/0076326 ("McMillan"), U.S. Patent Publication No. 2002/0156824 ("Armstrong"), and U.S. Patent No. 7,032,222 ("Karp").

VII.   ARGUMENT

In this Appeal, Appellants argue that claims 1-24 are patentable over Berger, McMillan, Armstrong, and Karp, whether viewed separately or in combination for at least the reasons discussed below. Independent claim 1 is representative of claims 1-24.

MPEP § 2143 states that "[t]he key to supporting any rejection under 35 U.S.C. 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious. The Supreme Court in KSR noted that the analysis supporting a rejection under 35 U.S.C. 103 should be made explicit." *KSR International Co. v. Teleflex Inc.,* 127 S.Ct. 1727 (2007). Further, when combining prior art elements, the Examiner "must articulate the following: (1) a finding that the

prior art included each element claimed, although not necessarily in a single prior art reference, with the only difference between the claimed invention and the prior art being the lack of actual combination of the elements in a single prior art reference...." MPEP § 2143(A). Appellants respectfully assert that Berger, McMillan, Armstrong, and Karp fail to disclose or otherwise render obvious each and every element of the claims, either individually or combined.

1.   The combination of Berger and McMillan to render obvious the feature that non-global OS partitions each comprise a file system is improper

The claimed invention requires, in part, that each non-global OS partition comprises a file system. The Examiner cites Berger as disclosing a plurality of non-global OS partitions. *See* Office Action p.3. However, Examiner admits that Berger does not explicitly teach that each of the non-global OS partition comprises a file system. The Examiner instead relies on McMillan as disclosing that each non-global OS partition comprises a file system. *See* Final Office Action p. 3. Specifically, Examiner contends that "[i]t would have been obvious to one of ordinary skill in the art at the time of the invention to try to modify Berger to explicitly teach a separate file system for each partition. One would be motivated by the desire to provide better isolation from each of the other environments as taught by McMillan." *See* Office Action p. 3-4.

The Federal Circuit has found that "[a]n inference of nonobviousness is especially strong where the prior art's teachings undermine the very reason being proffered as to why a person of ordinary skill would have combined the known elements." *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1326 (Fed. Cir. 2009).

Assuming, *arguendo*, that Berger discloses a plurality of non-global operating system partitions and McMillan discloses that each non-global operating system partition comprises a file system, there is no motivation to combine the cited prior references.

Specifically, McMillan is directed to "the creation of multiple, semi-independent virtual [operating system] environments within a single operating system." *See* McMillan, para. [0008]. Specifically, "[t]he file system and registry information for each environment is independent of the base OS and other environments." *See* Id. By contrast, Berger discloses the use of "containment," which includes placing strict controls on which resources an application can access. *See* Berger paragraph [0010]. Specifically, processes are partitioned using labels or tags. *See* Berger para. [0035]. Thus, each container does not have its own file system, but restricts applications to access only certain resources of a common file system. Further, Berger discloses that using the tagging system "alleviate[s] the requirement of editing a configuration file for managing compartments by providing utilities that may be utilized within the user-space of an [operating system]. *See* Berger, para. [0130]. Accordingly, the tagging system of Berger is clearly directed to a containment system that requires little editing of the underlying system. A person skilled in the art would not be motivated to modify Berger so that each container comprises a separate file system because Berger is directed to simplifying the compartment system by avoiding editing configuration files by merely tagging the resources already available – the creation of separate file systems would necessarily resulting the substantial editing of the configuration files of the underlying operating system. Further, the additional of multiple executing environments to the system of Berger (as opposed to utilizing the single OS compartment system of Berger) would result in a significant amount of editing of the configuration file.

The excessive amount of editing required to perform the modification proposed by the Examiner is counter to the underlying purpose of Berger, which seeks to minimize editing of the configuration files. For these reasons, Berger and McMillan are not properly combinable.

2. Karp fails to disclose or render obvious associating a second resource limit with a first group of processes within the non-global partition.

Examiner asserts that Berger, McMillan and Armstrong to not explicitly disclose associating a second resource limit with a first group of processes within the non-global partition, and instead relies on Karp. *See* Office Action p. 4. However, Appellants assert that Karp also fails to disclose the limitation.

Specifically, the Examiner contends that Karp discloses a second resource limit because it "teaches a high watermark limit which is the maximum amount of resources available and hard limits that are assigned to each user wherein each user can have multiple tasks." *See* Office Action p. 4. Appellants disagree with the Examiner's assertions.

Specifically, Karp recites a single "high watermark" that "is an upper limit on the total utilization of the resource." *See* Karp col. 3, likes 45-46. The watermark limit of Karp is applied to <u>all</u> tasks that utilize a resource. Said another way, Karp merely discloses one resource limit (*i.e.,* the high watermark) that is applied to a group of processes (*i.e.,* tasks). Karp discloses that resources are allocated on a per-user basis. *See, e.g.,* Karp, col. 3, lines 62-68. Further, Karp discloses that "the resource manager 12 determines whether the total allocation obtained at step 100 would cause the grand total allocation of the resource 10 to all users to exceed the high watermark of the resource." *See,* Karp col. 4, lines 23-26.

However, the claimed invention requires a _first_ resource limit associated with a first group of processes, and a _second_ resource limit associated with the first group of processes, as well as a _third_ resource limit associated with a second group of processes. There is no disclosure in Karp of a first limit _and_ a second limit associated with a first group of processes, and a third limit associated with a second group of processes. In fact, there is only a single limit (the high watermark), used for all processes in Karp. Accordingly, the prior art fails to disclose or otherwise render obvious associating a second resource limit with a first group of processes within the non-global partition.

3.   Summary

The framework for a rejection under 35 U.S.C. § 103 provides that all claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would yield nothing more than predictable results to one of ordinary skill in the art. *See KSR International Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1739 (2007). For at least the reasons described above, the cited prior art fails to disclose or otherwise render obvious each and every limitation of independent claim 1. Moreover, at least Berger and Midgley are not properly combinable. Accordingly, the Examiner has failed to establish a prima facie case of obviousness for independent claim 1 in view of Berger, Armstrong, McMillan, and Midgley. *In re Kahn*, 441 F.3d 977, 985-986 (Fed. Cir. 2006) ("On appeal to the Board, an applicant can overcome a rejection by showing insufficient evidence of *prima facie* obviousness or by rebutting the *prima facie* case with evidence of secondary indicia of nonobviousness") (emphasis in original) (quoting *In re Rouffet*, 149 F.3d 1350, 1355 (Fed. Cir. 1998)); *see also* 37 C.F.R. § 41.37(c)(1)(vii).

VIII.   Conclusion

In view of the above, the Examiner's contentions do not support the rejection under 35

U.S.C. §103(a). Accordingly, a favorable decision from the Board is respectfully requested.

Dated: March 2, 2010   Respectfully submitted,

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CLAIMS APPENDIX

Claims Involved in the Appeal of Application Serial No. 10/771,698

1. A machine-implemented method, comprising:

>   establishing, within a global operating system environment provided by an operating system, a non-global partition which serves to isolate processes running within the non-global partition from at least one other non-global partition within the global operating system environment, wherein each of the non-global partitions share an operating system kernel with the global operating system environment, and wherein each of the non-global partitions comprises a distinct file system;

>   associating a first resource limit with the non-global partition, wherein the first resource limit indicates a maximum amount of a particular resource that may be allocated to the non-global partition;

>   associating a second resource limit with a first group of processes within the non-global partition, wherein the second resource limit indicates a maximum amount of the particular resource that may be allocated to the first group of processes; and

>   associating a third resource limit with a second group of processes within the non-global partition, wherein the third resource limit indicates a maximum amount of the particular resource that may be allocated to the second group of processes.

2. The method of Claim 1, wherein a global partition administrator sets the first resource limit.

3. The method of Claim 1, wherein a non-global partition administrator sets at least one selected from a group consisting of the second resource limit and the third resource limit.

4. The method of Claim 1, further comprising:

    receiving a resource allocation request for the particular resource from a process executing in the first group of processes;

    determining an amount of the particular resource that may be allocated; and

    allocating the determined amount to the first group of processes.

5. The method of Claim 4, wherein determining further comprises:

    calculating an available amount of the particular resource, and wherein if the resource allocation request is less than or equal to the available amount, then the determined amount is set to the amount of the resource allocation request.

6. The method of Claim 5, wherein if the resource allocation request is greater than the available amount, then the determined amount is set to the available amount.

7. The method of Claim 5, wherein if the resource allocation request is greater than the available amount, then the determined amount is set to zero.

8. The method of Claim 5, wherein calculating further comprises:

    calculating a first amount by subtracting the total amount of the particular resource allocated to the non-global partition from the first resource limit;

    calculating a second amount by subtracting the total amount of the particular resource allocated to the first group of processes from the second resource limit; and

setting the available amount to the lower of the first amount and the second amount.

9. A machine-readable storage medium having stored thereon at least a portion of an operating system the machine readable storage medium comprising:

establishing, within a global operating system environment provided by an operating system, a non-global partition, which serves to isolate processes running within the non-global partition from at least one other non-global partition within the global operating system environment, wherein each of the non-global operating system partitions share an operating system kernel with the global operating system environment, and wherein each of the non-global partitions comprises a distinct file system;

associating a first resource limit with the non-global partition, wherein the first resource limit indicates a maximum amount of a particular resource that may be allocated to the non-global partition;

associating a second resource limit with a first group of processes within the non-global partition, wherein the second resource limit indicates a maximum amount of the particular resource that may be allocated to the first group of processes; and

associating a third resource limit with a second group of processes within the non-global partition, wherein the third resource limit indicates a maximum amount of the particular resource that may be allocated to the second group of processes.

10. The machine-readable medium of Claim 9, wherein a global administrator sets the first resource limit.

11. The machine-readable medium of Claim 9, wherein a non-global administrator sets at least one selected from a group consisting of the second resource limit and the third resource limit.

12. The machine-readable medium of Claim 9, further comprising:

    receiving a resource allocation request for the particular resource from a process executing in the first group of processes;

    determining an amount of the particular resource that can be allocated; and

    allocating the determined amount to the first group of two or more processes.

13. The machine-readable medium of Claim 12, wherein the determining step further comprises:

    calculating an available amount of the particular resource, and wherein if the resource allocation request is less than or equal to the available amount, then the determined amount is set to the amount of the resource allocation request.

14. The machine-readable medium of Claim 13, wherein if the resource allocation request is greater than the available amount, then the determined amount is set to the available amount.

15. The machine-readable medium of Claim 13, wherein if the resource allocation request is greater than the available amount, then the determined amount is set to zero.

16. The machine-readable medium of Claim 13, wherein the calculating step further comprises:

calculating a first amount by subtracting the total amount of the particular resource allocated to the non-global partition from the first resource limit;

calculating a second amount by subtracting the total amount of the particular resource allocated to the first group of processes from the second resource limit; and

setting the available amount to the lower of the first amount and the second amount.

17. An apparatus for implementing at least a portion of an operating system, comprising:

a mechanism for establishing, within a global operating system environment provided by an operating system, a non-global partition, which serves to isolate processes running within the non-global partition from at least one other non-global partition within the global operating system environment, wherein each of the non-global partitions share an operating system kernel with the global operating system environment, and wherein each of the non-global partitions comprises a distinct file system;

a mechanism for associating a first resource limit with the non-global partition, wherein the first resource limit indicates a maximum amount of a particular resource that may be allocated to the non-global partition;

a mechanism for associating a second resource limit with a first group of processes within the non-global partition, wherein the second resource limit indicates a maximum amount of the particular resource that may be allocated to the first group of two or more processes; and

a mechanism for associating a third resource limit with a second group of processes within the non-global partition, wherein the third resource limit indicates a maximum

amount of the particular resource that may be allocated to the second group of processes.

18. The apparatus of Claim 17, wherein a global administrator sets the first resource limit.

19. The apparatus of Claim 17, wherein a non-global administrator sets the second resource limit and the third resource limit.

20. The apparatus of Claim 17, further comprising:

a mechanism for receiving a resource allocation request for the particular resource from a process executing in the first group of processes;

a mechanism for determining an amount of the particular resource that may be allocated; and

a mechanism for allocating the determined amount to the group of processes.

21. The apparatus of Claim 20, wherein the determining mechanism further comprises:

a mechanism for calculating an available amount of the particular resource, and wherein if the resource allocation request is less than or equal to the available amount, then the determined amount is set to the amount of the resource allocation request.

22. The apparatus of Claim 21, wherein if the resource allocation request is greater than the available amount, then the determined amount is set to the available amount.

23. The apparatus of Claim 21, wherein if the resource allocation request is greater than the available amount, then the determined amount is set to zero.

24. The apparatus of Claim 21, wherein the calculating mechanism further comprises:

a mechanism for calculating a first amount by subtracting the total amount of the particular resource allocated to the non-global partition from the first resource limit;

a mechanism for calculating a second amount by subtracting the total amount of the particular resource allocated to the first group of processes from the second resource limit; and

a mechanism for setting the available amount to the lower of the first amount and the second amount.

EVIDENCE APPENDIX

No evidence pursuant to §§ 1.130, 1.131, or 1.132 or entered by or relied upon by the examiner is being submitted.

RELATED PROCEEDINGS APPENDIX

No decision has been issued in the related proceeding referenced in II. above, hence copies of decision in related proceeding is not provided.